EXHIBIT B

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PROSECUTION/ACQUISITION BAR MATERIALS

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

NETWORK-1 TECHNOLOGIES, INC. Plaintiff, - against - GOOGLE LLC and YOUTUBE, LLC Defendants.	14 Civ. 2396 (PGG-SN) 14 Civ. 9558 (PGG-SN)

EXPERT REPORT OF DR. SAMRAT BHATTACHARJEE

identification."[422] In my opinion, the technology described in the Iceberg Patents is comparable to that described in the Asserted Patents.

XVI. THERE ARE NO TECHNICAL IMPEDIMENTS TO THE NON-INFRINGING ALTERNATIVE OF GEOGRAPHICALLY LOCATING A PORTION OF DEFENDANTS' CONTENT ID SYSTEM OUTSIDE OF THE UNITED STATES

453. I understand that Defendants contend that an "available non-infringing alternative is geographically locating the servers running the Accused Instrumentalities, or a portion of the Accused Instrumentalities, outside of the United States."[423]

454. On February 10, 2020, I spoke with Matthias Konrad, the lead engineer for Content ID, and Oleg Ryjkov, a member of Mr. Konrad's team, to gain a further understanding of the geographical location of the servers running Defendants' Content ID system. Based on that conversation and my review of the other evidence, I understand that [redacted] typically is performed in the same data center where YouTube generates transcodes of user-uploaded videos.[424] These data centers currently are located in at least Asia, Europe, South America, and the United States.[425]

455. I understand that the Match System component of the Content ID system currently operates on machines located in the United States and Europe.[426] With respect to [redacted] there are currently [redacted]

[422] Mitzenmacher Rep. ¶ 294.

[423] Defendants' Third Supplemental Response to Plaintiff's Interrogatory No. 13; *see* Mitzenmacher Rep. ¶ 505.

[424] Interview with Matthias Konrad & Oleg Ryjkov, February 10, 2020; Konrad Depo. Tr. 52:14–53:7.

[425] Interview with Matthias Konrad & Oleg Ryjkov, February 10, 2020.

[426] Interview with Matthias Konrad & Oleg Ryjkov, February 10, 2020.

[redacted] on machines located in the United States and [redacted] on machines located in Europe.[427]

456. I understand that [redacted] runs on different servers than [redacted].[428] The servers running [redacted] may be located in different data centers than those running [redacted].[429] The servers that serve videos and advertisements to YouTube viewers likewise may be in altogether different data centers than the servers that run the [redacted][430]

457. In my opinion, there are no technical barriers to relocating the instances of the Match System that are currently located in the United States to another country. I have reviewed Dr. Mitzenmacher's analysis of this non-infringing alternative, which includes his assertion that "there are significant outstanding questions (both technical and cost-related) concerning whether or not locating the servers (or a portion of the servers) running the Content ID Accused Instrumentalities outside the United States is a viable alternative."[431] I disagree with Dr. Mitzenmacher.

458. The geographical location of servers affects latency. All else equal, the time it takes to transmit data from one server to another increases as the distance between them increases. Typically data transmitted on a fiber-optic network will travel at around two-thirds the speed of light, or about 5 *microseconds* (0.000005 seconds) per kilometer. The chart below illustrates

[427] Interview with Matthias Konrad & Oleg Ryjkov, February 10, 2020.

[428] Interview with Matthias Konrad & Oleg Ryjkov, February 10, 2020.

[429] Interview with Matthias Konrad & Oleg Ryjkov, February 10, 2020.

[430] Interview with Matthias Konrad & Oleg Ryjkov, February 10, 2020.

[431] Mitzenmacher Rep. ¶ 505.

approximate round-trip transmission times in *milliseconds* (0.0001 seconds) for data traversing a fiber-optic cable:[432]

Route	Distance	Time, light in vacuum	Time, light in fiber	Round-trip time (RTT) in fiber
New York to San Francisco	4,148 km	14 ms	**21 ms**	42 ms
New York to London	5,585 km	19 ms	**28 ms**	56 ms
New York to Sydney	15,993 km	53 ms	**80 ms**	160 ms
Equatorial circumference	40,075 km	133.7 ms	**200 ms**	200 ms

Table 1-1. Signal latencies in vacuum and fiber

459. As the chart above indicates, a round-trip data transmission from New York City to San Francisco using a fiber-optic cable would take approximately 0.042 seconds, while a transmission from New York City to London would take approximately 0.056 seconds.[433] The chart below illustrates the round-trip transmission time in milliseconds for certain trans-Atlantic submarine fiber-optic cables in use in 2015:[434]

[432] Ilya Grigorik, *High Performance Browser Networking*, available online at https://hpbn.co/primer-on-latency-and-bandwidth/.

[433] As discussed below, the transmitting data [redacted] requires a modest amount of bandwidth, such that there would be little or no additional latency due to queuing of the data. *See* ¶¶ 469–72 *supra.*

[434] TeleGeography and Hibernia Networks, *Trans-Atlantic Network Latency Reduced* (Oct. 9, 2015), available online at https://www.thebroadcastbridge.com/content/entry/3988/trans-atlantic-network-latency-reduced.

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